

IN THE UNITED STATES  
PATENT AND TRADEMARK OFFICE

**PATENT APPLICATION**

Applicants: Petra SPECHT, Eicke R. WEBER,  
Todd Russell WEATHERFORD

Case: UCB-3/CIP(B99-025-3)

Serial No.:

Filed:

Group Art Unit:

Confirmation No.:

Examiner:

Title: DOPING-ASSISTED DEFECT CONTROL IN COMPOUND  
SEMICONDUCTORS

Mail Stop Patent Application  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

S I R:

**DISCLOSURE STATEMENT**

The applicants respectfully request that the following references be considered in the examination of the above-identified application. A copy of each reference is enclosed.

**Publications**

- AA. F.W. Smith et al, "New MBE Buffer Used to Eliminate Backgating in GaAs MESFET's", IEEE Electron Device Letters, Vol. 9, No. 2, 1988, pp. 77-80.
- AB. G.M. Metze et al, "Effects of Very Low Growth Rates on GaAs Grown by Molecular Beam Epitaxy at Low Substrate

- Temperatures", Applied Physics Letters, Vol. 42, No. 9, 1 May 1983, pp. 818-820.
- AC. S. Gupta et al, "Ultrafast Carrier Dynamics in III-V Semiconductors Grown by Molecular-Beam Epitaxy at Very Low Substrate Temperatures", IEEE Journal of Quantum Electronics, Vol. 28, No. 10, October 1992, pp. 2464-2472.
- AD. S. Gupta et al, "Subpicosecond Carrier Lifetime in GaAs Grown by Molecular Beam Epitaxy at Low Temperatures", Applied Physics Letters, Vol. 59, No. 25, 16 December 1991, pp. 3276-3278.
- AE. T.R. Weatherford et al, "Effects of Low-Temperature Buffer-Layer Thickness and Growth Temperature on the SEE Sensitivity of GaAs HIGFET Circuits", IEEE Transactions on Nuclear Science, Vol. 44, No. 6, December 1997, pp. 2298-2305.
- AF. D.C. Look, "On Compensation and Conductivity Models for Molecular-Beam-Epitaxial GaAs Grown at Low Temperature", Journal of Applied Physics, Vol. 70, No. 6, 15 September 1991, pp. 3148-3151.
- AG. M. Kaminska et al, "High Resistivity of Low Temperature MBE GaAs", Semi-Insulating III-V Materials, Proceedings of the 6<sup>th</sup> Conference on Semi-insulating III-V Materials, 13-16 May 1990, Toronto, Canada, pp. 111-116.
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- AI. M. Luysberg et al, "Effects of the Growth Temperature and As/Ga Flux Ratio on the Incorporation of Excess As into Low Temperature Grown GaAs", Journal of Applied Physics, Vol. 83, No. 1, 1 January 1998, pp. 561-566.

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- AK. M.R. Melloch et al, "Formation of Arsenic Precipitates in GaAs Buffer Layers Grown by Molecular Beam Epitaxy at Low Substrate Temperatures", Applied Physics Letters, Vol. 57, No. 15, 8 October 1990, pp. 1531-1533.
- AL. X. Liu et al, "Mechanism Responsible for the Semi-Insulating Properties of Low-Temperature-Grown GaAs", Applied Physics Letters, Vol. 65, No. 23, 5 December 1994, pp. 3002-3004.
- AM. B.J. Lin et al, "Anomalies in MODFET's with a Low-Temperature Buffer", IEEE Transactions on Electron Devices, Vol. 37, No. 1, January 1990, pp. 46-50.
- AN. Z. Liliental-Weber et al, "Structural Properties of the GaAs Layers Grown by MBE at Low Temperatures", Semi-Insulating III-V Materials, Proceedings of the 8<sup>th</sup> Conference on Semi-insulating III-V Materials, 6-10 June 1994, Warsaw, Poland, pp. 305-317.
- AO. P. Specht et al, "Defect Control in As-Rich GaAs", Materials Science Forum, Proceedings of the 19<sup>th</sup> International Conference on Defects in Semiconductors, Aveiro, Portugal, July 1997, Vols. 258-263, pp. 951-956.
- AP. M.K. Weilmeier et al, "A New Optical Temperature Measurement Technique for Semiconductor Substrates in Molecular Beam Epitaxy", Canadian Journal of Physics, Vol. 69, 1991, pp. 422-426.
- AQ. U. Siegner et al, "Ultrafast High-Intensity Nonlinear Absorption Dynamics in Low-Temperature Grown Gallium

- Arsenide", Applied Physics Letters, Vol. 69, No. 17, 21 October 1996, pp. 2566-2568.
- AR. P. Grenier et al, "Subband Gap Carrier Dynamics in Low-Temperature-Grown GaAs", Applied Physics Letters, Vol. 70, No. 15, 14 April 1997, pp. 1998-2000.
- AS. T.S. Sonsnowski et al, "High-Carrier-Density Electron Dynamics in Low-Temperature-Grown GaAs" Applied Physics Letters, Vol. 70, No. 24, 16 June 1997, pp. 3245-3247.
- AT. M.R. Melloch et al, "Formation of Two-Dimensional Arsenic-Precipitate Arrays in GaAs", Applied Physics Letters, Vol. 61, No. 2, 13 July 1992, pp. 177-179.
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- AW. J. Gebauer et al, "Defect Identification in GaAs Grown at Low Temperatures by Positron Annihilation", Journal of Applied Physics, Vol. 87, No. 12, 15 June 2000, pp. 8368-8379.
- AX. E.R. Weber et al, "Identification of As<sub>Ga</sub> Antisites in Plastically Deformed GaAs", Journal of Applied Physics, Vol. 53, No. 9, September 1982, pp. 6140-6143.
- AY. D.E. Bliss et al, "Annealing Characteristics of Low Temperature Grown GaAs:Be", Materials Research Society Symposium Proceedings, 4-6 December 1991, Boston, Massachusetts, Vol. 241, pp. 93-98.

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- BA. B.I. Shklovskii et al, "A General Description of Hopping Conduction in Lightly Doped Semiconductors" Chapter 4, Section 1, Electronic Properties of Doped Semiconductors, (© 1984, Springer-Verlag), pp. 74-82.
- BB. R.C. Lutz et al, "Thermal Stabilization of Non-Stoichiometric GaAs through Beryllium Doping", Materials Research Society Symposium Proceedings, 13-17 April 1998, San Francisco, California, Vol. 510, pp. 55-59.
- BC. S.M. Sze, Appendix H, Physics of Semiconductor Devices, 2<sup>nd</sup> ed., (© 1981, John Wiley & Sons, Inc.), pp. 850-851.
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- BF. M. Oestreich et al, "Picosecond Spectroscopy of Plastically Deformed GaAs", Journal of Luminescence, Vol. 58, (© 1994, Elsevier Science B.V.), pp. 123-126.

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- BI. Sprecht et al, "Defect Control in As-Rich GaAs", Materials Science Forum, Vols. 258-263, Switzerland, 1997, pp. 951-956.
- BJ. Lutz et al, "Electrical Properties and Thermal Stability of Be-doped Non-stoichiometric GaAs", Semiconducting and Insulating Materials, 1998, Proceedings of the 10<sup>th</sup> Conference, Berkeley, CA, June 1, 1998-June 5, 1998, pp. 113-117.
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- BM. Luysberg et al, "Control of Stoichiometry Dependent Defects in Low Temperature GaAs", Semiconducting and Semi-Insulating Materials Conference, Toulouse, France, April 29, 1996 - May 3, 1996, pp. 21-26.

- BN. P. Specht et al, "Conductive Non-Stoichiometric III-V Compounds: Properties and Prospective Applications", Symposium on Non-Stoichiometric III-V Compounds, October 8<sup>th</sup>-10<sup>th</sup> 2001, Erlangen, Germany, pp. 1-6.
- BO. P. Specht et al, "Defect engineering in MBE grown GaAs-based materials", Int. Conf. SIMC-XI, Australia, 2000, 4 pages.

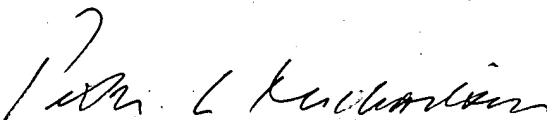
REMARKS

Under rule 37 C.F.R. 1.98(a) (effective March 16, 1992), since all of the above-cited references are in the English language, the applicants submit that no specific comments are necessary for any of these.

For the Examiner's convenience, the applicants have attached a completed modified Form PTO/SB/08B hereto.

Respectfully submitted,

November 12, 2003



Peter L. Michaelson, Attorney  
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Customer No. 007265  
(732) 530-6671

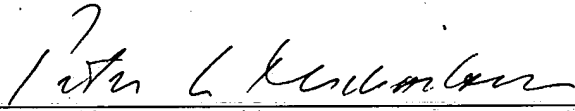
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		Filing Date	
		First Named Inventor	Petra SPECHT
		Group Art Unit	
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		<b>Group Art Unit</b>	
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number. <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

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